

CLAIMS:

1. Apparatus for monitoring the effect on a material of exposure to a fluid, said apparatus comprising a

5 sensor element formed as a ring of the material, wherein said ring is mounted coaxially in a section of pipe for carrying said fluid, so as to be exposed to said fluid, and is electrically insulated from said pipe, and means for monitoring changes in electrical resistance in said ring sensor element.

10 2. Apparatus as claimed in Claim 1 further comprising a reference element, said reference element being formed also as a ring, mounted coaxially in said pipe section and insulated therefrom, said second ring element being protected from exposure to said fluid.

15 3. Apparatus as claimed in claim 2, wherein said sensor and reference elements each comprise at least one pair of diametrically opposed electrical connection points.

20 4. Apparatus as claimed in claim 3, wherein each of said elements comprises a predetermined number of pairs of diametrically opposed connection points, said connection points on each element being regularly spaced around the respective ring.

25 5. Apparatus as claimed in either of claims 3 or 4, wherein said sensor and reference element are connected in series by respective pairs of said

Sub
R2
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*Sub
P2
Concluded*

diametrically opposed connection points, and said means for monitoring is arranged to determine the ratio of the resistances of said elements.

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6. Apparatus as claimed in claim 5 as dependent on claim 4, wherein said means for monitoring is arranged to drive a current through said series connected elements and to pick off voltage values from the various connection points.

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7. Apparatus as claimed in claim 6, wherein said monitoring means is arranged to make at least one further set of measurements by reconnecting the elements in series by different pairs of diametrically opposed connection points, driving a current through the series connected elements and picking off a further set of voltage values from the various connection points.

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8. Apparatus as claimed in any of claims 2 to 7, wherein said elements are coaxially spaced apart by a spacer ring.

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9. Apparatus as claimed in Claim 8, wherein said spacer ring comprises a pressure sensor.

*Sub
P3*

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10. Apparatus as claimed in any preceding claim, wherein at least said sensor element comprises a section cut from said pipe.